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Gloeckner

CARNATION MANUAL

1962

Fred C. ~~Gloeckner~~ & Company, Inc.
15 East 26th St.
New York 10, N. Y.



**Better
Cuttings
Produce
Better
Carnations**

Production records from highly selected and cultured stock very clearly prove that the purchase of such stock will more than return the investment through increased quality and production.

Remember, an increase of less than one flower per plant is all that is needed to pay for the entire program.

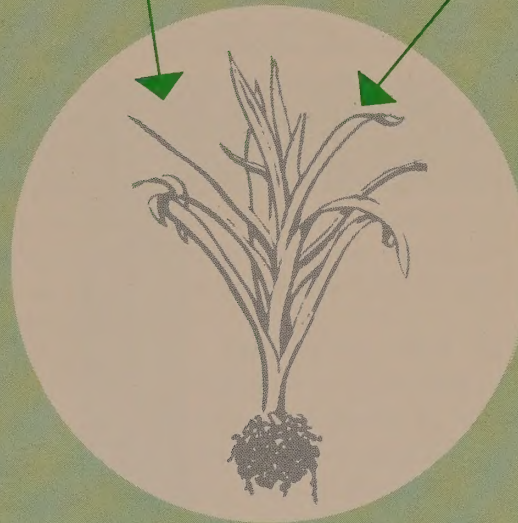
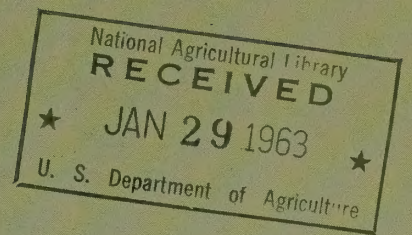
Buy your cuttings from a firm that knows carnation culture, varietal characteristics, and can stand behind what they sell. When buying a carnation cutting from the specialist, you are paying for more than a good cutting. Included in this price is the service of a well-qualified GLOECKNER REPRESENTATIVE who is widely versed in the latest cultural methods, and who can plan a CARNATION PROGRAM that will yield the greatest financial return from your producing area.

FRED C. GLOECKNER & CO., INC. • 15 EAST 26TH STREET • NEW YORK 10, N. Y. • OREGON 9-6460



Homer Hill and his son look over their White Sim sport, "Alaska", a fine new selection with heavy stems, good production, and no splits.

THE "PROFIT TRIANGLE"



Much of the success of this triangle rests in the quality of the CARNATION CUTTING.

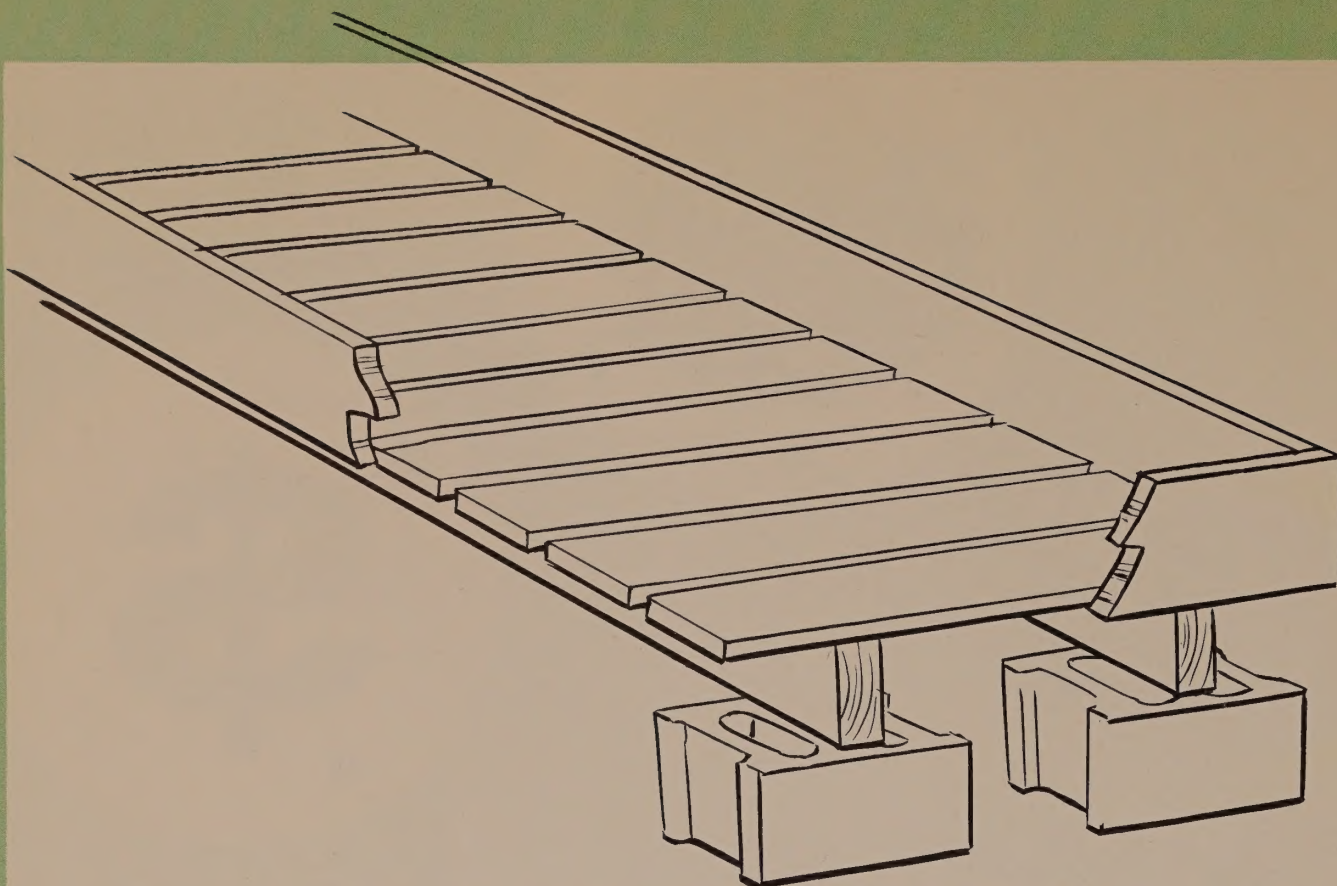
The price of a well-rooted, healthy, highly selected carnation cutting, delivered ready to plant, sells for about the same price as a *single carnation bloom*. Yet so much depends on this cutting.

Make sure the cutting *YOU* plant has these qualities:

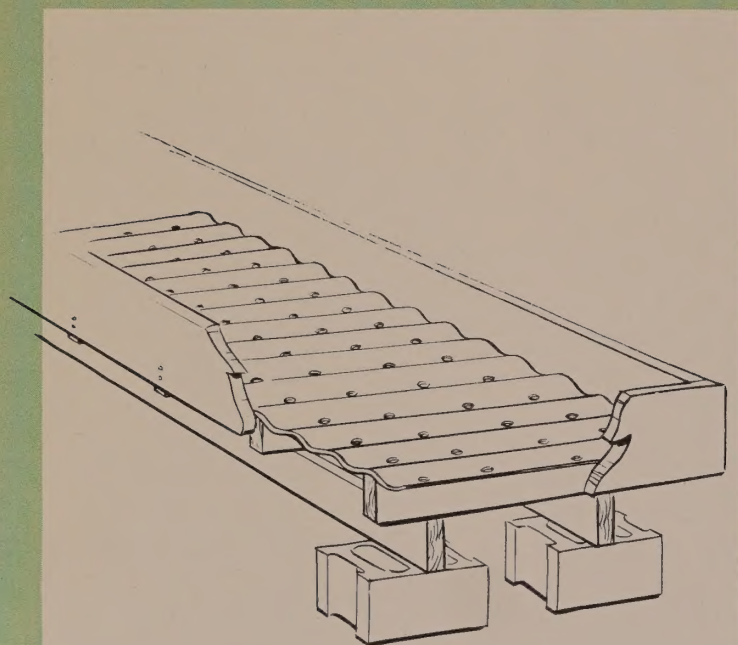
- (1) Cultured free of vascular disease.
- (2) Highly selected to yield flowers that are large, full-crowned, with good color.

- (3) Grown from mother-block plants that yield a stocky cutting high in reserve food.
- (4) Properly rooted with a strong healthy root system.
- (5) Available to plant at the proper time.

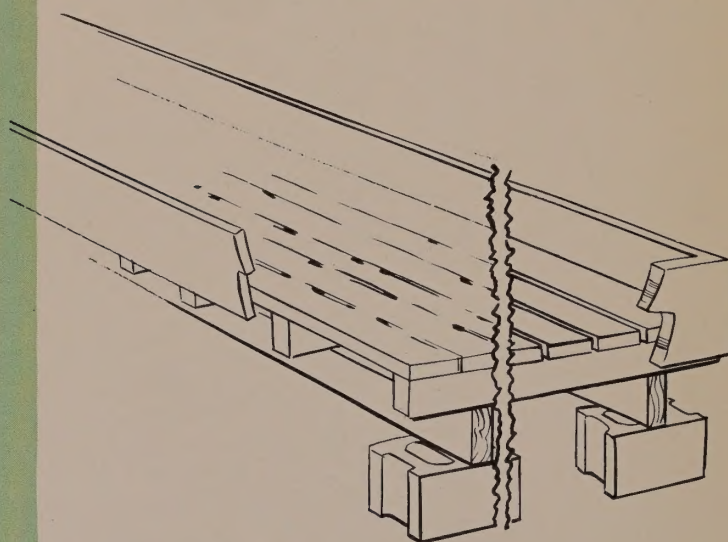
Buy your cuttings from a firm that knows carnation culture, varietal characteristics, and can stand behind what they sell. When buying a carnation from the specialist, you are paying for more than a good cutting. Included in this price is the service of a well-qualified GLOECKNER REPRESENTATIVE who is widely versed in the latest cultural methods, and who can plan a CARNATION PROGRAM that will yield the greatest financial return from your producing area.



Redwood boards running cross-wise of the bench provides positive drainage. This construction also saves one set of 2" x 4" stringers.



Holes should be drilled in the lowest part of the depression in transite benches. Don't depend on lateral movement to get rid of irrigation.



Older wooden benches frequently "seal". These benches should be checked and re-opened with a power saw. The routine matter of providing proper drainage in the carnation bed is often overlooked.

The Carnation Bench

Don't overlook the importance of a well-drained carnation bench. With today's automatic watering, benches must drain "freely".

Benches Must Drain Well

The raised bench, or the ground bed, in which the carnation is grown, plays a very important part in raising a good crop of carnations. Even though this may be considered elementary, benches which once provided adequate drainage when they were first constructed may create major problems when the cracks swell shut or the holes in concrete benches become clogged.

"Hard-Pans" which form in the bottom of benches create uneven growth. This is due to a build-up of soluble salts in an area where water will not flow freely out of the bench. In preparing soil in readiness for planting, the growers should make sure that the entire depth is well worked over. Too many times, power-tillers do not reach to the outer extremities of the bench and the small areas they miss invariably turn into "*Hard-Pans*".

Since the practice of constant feeding with injectors has been so popular, it is even more important that adequate drainage is provided so benches and beds can be slightly leached with every watering. Ground beds should always be provided with a drain tile to carry off excess irrigation water and soluble salts. It is becoming increasingly popular to build raised benches very low thus providing for adequate growing room for the taller Sim varieties. These ground beds are constructed so there are only four or five inches under the bench. Where both ground beds and raised benches (very low) are in the same range, growers report faster first crops on the bench that is raised. With air movement under the bench, the crop dries out faster and the soil temperature is higher.

The importance of proper soil preparation cannot be over-emphasized. Little short cuts in this important job can spell doom to a good carnation crop.

The physical nature of soils is basically the only feature

of prime importance in selecting a good carnation soil. Generally, open soils which are well-aerated are recommended. If only heavy soil is available in a given area, it is possible to condition the soil with bulky organic matter thus providing adequate drainage. Prior to moving in bench soil, it should be tested for soluble salts, pH and the full range of nutrients. It is wise also to run a porosity test. This can be done by simply filling up a four inch clay pot with soil and measuring the time that it takes for subsequent waterings to drain from the pot. After several applications, if water stands freely at the top of the pot, the soil that has been selected is sub-standard and should either be discarded or liberal amounts of organic matter should be added to this type of soil.

One of the main advantages that steam-sterilization offered to the carnation grower when it first became vogue, was that of saving of labor in changing soils. With today's labor costs, it would be impossible to change soils every year with a wheelbarrow. However, with the advantages that power wheelbarrows and power conveyors offer the carnation grower, it would be worthwhile to evaluate a program whereby greenhouse soils were changed every three to five years. This soil should be taken back to the field where a cover crop could be grown on it, and the advantages offered by freezing and thawing and general leaching action of the weather over a period of five years, would be helpful in maintaining good greenhouse soil over a long range period.

Like so many of the newer greenhouse practices, such as the use of peat moss with 100% elimination of manure, the use of liquid feed with a complete elimination of organic top dressing, and the holding of greenhouse soils in a bench for 20 years without changing it; one could easily assume that many of our new methods are practiced to an extreme *whereas a combination of both systems would be of greater advantage.*



Leaves, above, as furnished free by municipal street departments, make an excellent soil conditioner. Leaves, unlike peat moss, open soil without leaving a "fluffy" end result.

Leaves provide an excellent mulch, right, by holding moisture in soil, but at same time do not hold focal portions of the plant too wet. Leaves never seal off air.

Below, outside nursebeds carry liberal amounts of leaf mold. These are steamed in the fall and are planted the next spring.



Soil Preparation

**Take time to properly prepare the benches
where carnations will be planted.
The effect, good or bad, will determine
to a large extent the productiveness
of the unit . . .**

Most carnation producing areas have at their disposal satisfactory organic matter which can very efficiently lighten greenhouse soils. While German and Canadian peat moss works very well in this capacity, such forms of organic matter as leaves, tobacco stems, redwood shavings, peanut hulls, and other forms of roughage can do the job just as well and at a more reasonable cost. It is quite easy to "over-peat" soils. Such a condition is one where finely broken-down peat moss seals the soil or turns a good loam soil into one that is too "fluffy". It is possible with coarser forms of organic matter to provide good drainage and aeration to plant roots, but at the same time have the advantage of a heavier soil.

Steam Sterilization

The practice of steam sterilizing carnation soils is about as customary as growing Sim carnations. But just the fact that it is an old practice, does not mean that there are short-cuts to this very important job.

Some Simple Rules to Follow in a Good Steam Sterilization Program

1. Thoroughly leach carnation benches a week to ten days prior to removal of the crop with two or three very heavy waterings in succession. It is much easier to remove soluble salts prior to planting rather than after.
2. The soil should be uniformly moist. It should be possible to make a ball of soil that will hold together but at the same time will break when pressure is applied to it with the thumb and the finger.
3. Everything that is to be added to the soil other than the plants themselves should be put into the soil prior

to steaming. This includes all organic matter and treble super-phosphate at the rate of 3 lbs. per 100 sq. ft. if it is needed together with calcium carbonate or ground limestone at the rate of 10 lbs. per 100 sq. ft. or gypsum at the same rate.

4. Carnation soils should be maintained at 180° Fahrenheit for 30 minutes in the coolest spot. If it takes more than 3 hours to do this job from start to finish on a raised bench, then the facilities are considered inadequate. A slow job of steam-sterilization can often lead to trouble.
5. Always check the soil temperature with an accurate soil thermometer. Make sure that the soil temperature reaches 180°. Timing this job is a dangerous gamble.
6. As soon as the steam is turned off remove the steam cover to allow escape of water vapor, thereby, maintaining proper soil moisture.
7. Do not disturb the soil with any tools, but plant directly into the bench as soon as soils properly cool. There is no advantage in reworking soils after they are steamed, and the chance of re-contaminating with disease is too great to warrant this "out-moded" practice.

Carnation soils today are lighter in texture than they have been in the past, therefore, it should not be difficult to hand-work these benches without the aid of power tools. Such power tools literally smash the soil structure; the one thing you are trying, at all cost, to build. Hand-forking the bench will also overcome the threat of creating a hard-pan which so often develops when power-tillers are used.

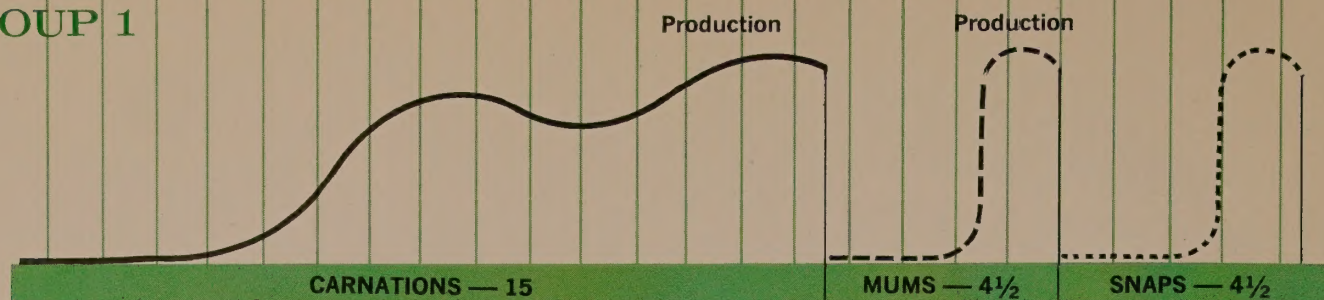
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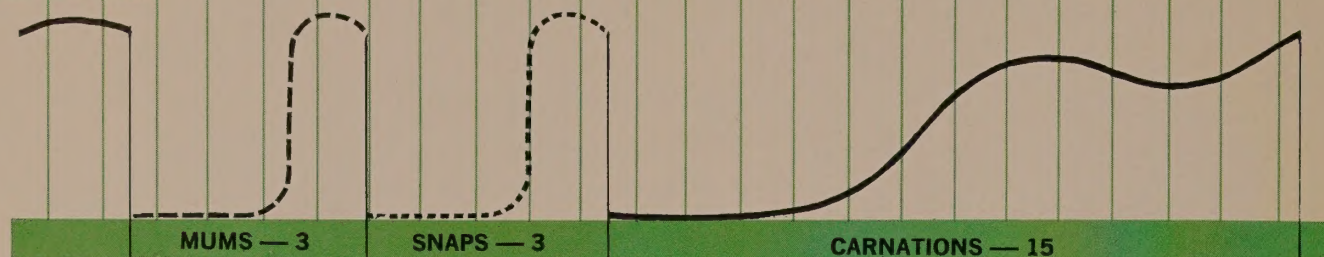
1964

JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUN. JUL. AUG. SEP. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY

GROUP 1

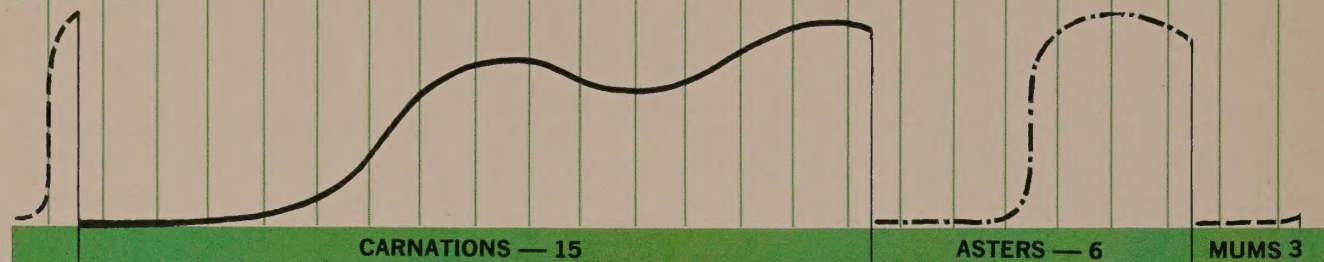


GROUP 2

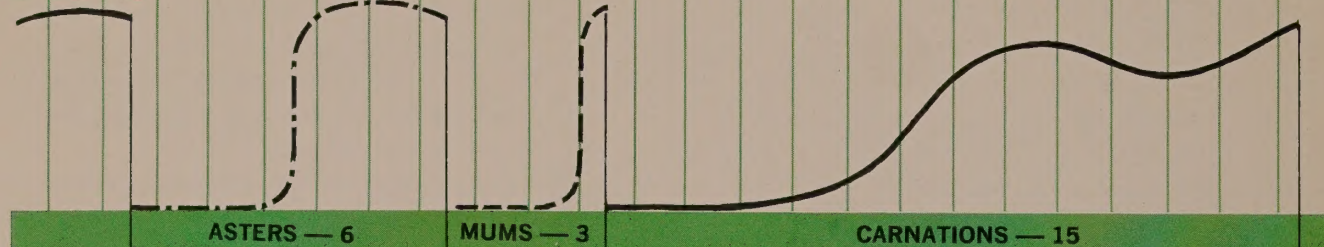


CARNATION, CHRYSANTHEMUM, SNAPDRAGON ROTATION

GROUP 1

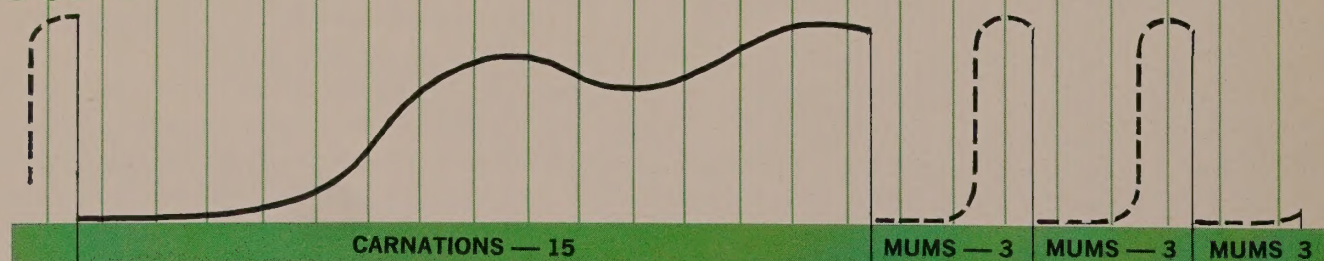


GROUP 2

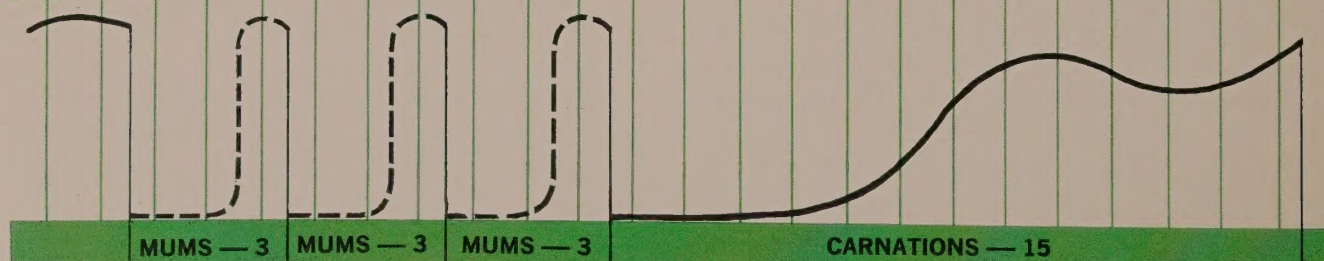


CARNATION, ASTER, CHRYSANTHEMUM ROTATION

GROUP 1



GROUP 2



CARNATION, CHRYSANTHEMUM ROTATION

Carnation Rotations

**Rotate crops so that there
is a steady production of blooms
when they are in greatest demand.**

An efficient carnation rotation is *becoming extremely* important to the successful carnation grower. Two-year production is practical only when it is planned. Recklessly carrying-over benches that “look good” in the early summer generally fail because they are not properly handled or they overcrop during periods when blooms are not wanted.

Rotations like these illustrated, enable the grower to plant carnations directly into the bench and still have flowers in production in another section. It also breaks up the work load into several periods during the year and in this way most experienced personnel can always supervise planting.

Rotating crops is recommended where several crops can efficiently be fit together so that carnations will always be

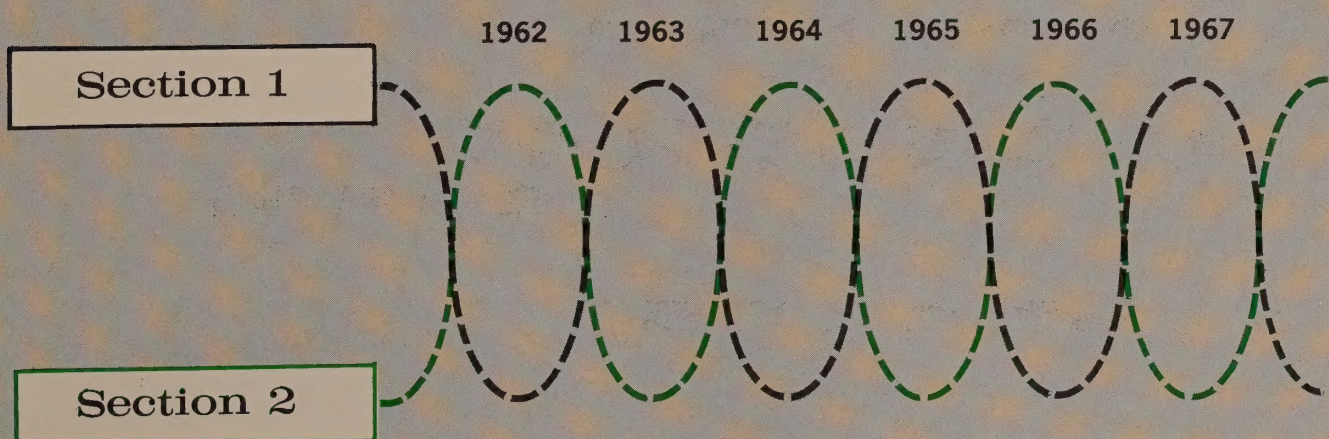
in bloom. There is the added advantage that the crop residue from one planting will be beneficial to the next crop. The root system left by the chrysanthemum crop is beneficial to the carnation crop, etc.

Plant on time with carnation cuttings from the specialist . . .

The greatest advantage the carnation grower has in buying his carnation cuttings from the specialist is that he can depend upon getting his requirements at the proper time and in the colors and varieties desired.

In the busy spring of the year, the carnation grower's main concern is with bloom production, and he cannot give the proper attention to carnation propagation. The carnation cutting specialist can give his full time to this important and technical phase.

The Two Platoon System



With such a schedule, two year carnations still maintain an even supply when carnations are in demand.

Carnation Spacing

The trend is toward
“more open” plantings,
especially with two
year rotations.



With the advent of air-conditioning, constant liquid feeding, and cultured mother-block cuttings, the recommended planting distance has been widened. Until recently, the recommended distance in the Colorado and California areas was 6" x 8", or 3 plants per foot. In the Midwest and East, the recommended spacing was somewhat closer, being 6" x 6", which is 4 plants per foot. Studies indicate now, that as good a quality and production can be derived from plants when wider spacing is used.

This is the recommended spacing
as it now stands.

California and Colorado (highlight areas)
7" x 8" (57 sq. inches)

Midwest and East (darker areas)
6" x 8" (48 sq. inches)

The Weirich system of planting is still very efficient and is recommended for these reasons:

1. Takes less wire and string to support carnations.
2. Less restrictive to automatic watering systems like Gates and Greco.
3. Cool air from air-conditioned greenhouses can move in and around plants much easier.
4. Easier to cut, disbud, and stall breaks.
5. Easier to carry-over benches.

Direct Benching

Direct benching is becoming more popular every year because this system eliminates much of the labor used in digging, moving, and planting of an established carnation plant. Cuttings, as supplied by the specialist, are generally planted direct between May 1st and June 15th. Cuttings used for direct planting, should be fat and husky; because at this wide spacing the carnation grower cannot take the time to build-up a puny, hard, “heel-cutting”. Plants are pinched the first time three to four weeks after they are planted and usually half of the resulting breaks are pinched again. This system is called “Pinch and a Half”. By following this method of pinching, severe cropping is overcome. Plants which are planted direct in May and June are generally in full production by fall.

It is important when following a direct planting sched-

The recent practice of using the Weirich Method of spacing is still gaining in acceptance, but the advantages of this system are settling down to be ones of physical advantage and not that of superior growth. Earlier indications pointed to a better quality in the middle of the winter. Under strict tests this has not proved to be the case.



Above, this type planting uses same number of plants that are used with regular spacing — plants are simply bunched together.

Cooled air moves through plants, right, much easier when the "Weirich System" of planting is used. ➤



ule, to keep the plants growing rapidly in the early stages after they are planted. There should be no shade whatsoever over young cuttings. Soil should never be allowed to dry-out. Adequate amounts of fertilizer should be used, regularly and in small amounts.

It should be stressed, that only well-rooted cuttings should be used when planting direct because there is not the second chance to rogue or eliminate any of the poorer plants as there is with a nurse-bed system. Don't be "Scotch" — throw away that cutting in question. You will be ahead!

Don't plant deep. If some of the cuttings fall over, it is a good sign. Those few can be straightened very easily. Most carnation diseases are aggravated by deep planting.

Nurse-Beds

While the efficiency and speed of direct planting offers many advantages, it is still hard to beat a well-managed

nurse-bed operation. If the producing area is more valuable than the labor required to replant that area with established plants, then the nurse-bed system is still recommended. For many retail or retail-wholesale growers, it is impossible to throw benches out in June when blooms are in demand.

The soil in nurse-beds should not be too deep. Depths over 5" dry too slowly. With the increased rate of growth of the mother-block cutting, plants should remain in the nurse-bed for much shorter periods and should not be held any longer than 8 weeks. After this period, plants begin to get hard, lower foliage starts to dry, and moving the plants presents a real problem. One of the main advantages of the nurse-bed is that it saves valuable space, yielding 4 benches of standard planted carnations for every one planted in the nurse-bed. There is also some indication that the blooms cut from the first crop of the nurse-bedded plants are superior compared to the quality cut from those planted direct.



The Greco automatic watering system is rapidly installed by simply rolling it between carnation rows. Watering should be done by hand several times to firm the soil and to establish water movement.

Automatic Watering

Automatic watering puts water on benches more uniformly and at lower cost than hand watering.

The advantages of automatic watering of carnation benches have well been established. Any grower who does not take advantage of one of these systems is missing a real opportunity to lower production costs and increase quality.

Two forms of automatic watering are widely used in this country — the Gates System and the Greco System. Both systems are good, but vary drastically in their approach to water application.

The Gates System employs the use of a semi-rigid plastic pipe installed around the perimeter of the bench with nylon or brass nozzles spaced every 24 to 30 inches apart, spraying across the bench towards the center. With wider benches (over 42"), nozzles with a delivery of 180° and 90° are alternated to give more uniform watering in the center of the bench. Plastic pipe, ¾" or one inch in diameter, is used and nozzle spacing depends upon the given installation. On benches 4 feet wide and over, a middle line down the center is recommended with 180° nozzles all pointing in the same direction and overlapping. One of the disadvantages of the Gates System has been the inability to thoroughly wet the center of wide benches.

The Greco System waters the bench by capillary action. Two or three lengths of black polyethylene tubing are placed on the soil "surface". Three lengths are used on benches over 4 feet wide. Small circular holes are punched into the tubing at intervals of 4, 6 or 8 inches. The 4 inch seems to



Benches can be watered with the Gates system in approximately 7 to 10 minutes each. One man can easily take charge of watering as many as 100 benches.



Surface watering with the Gates system can be done with both ¾" or 1" plastic tubing. Such efficient systems take many man hours out of growing carnations. Liquid feeding through these devices is strongly recommended.

be the most popular spacing for carnations. Benches where the Greco System is to be installed must be reasonably level and the water supply should be free of physical impurities such as fine sand and algae. Also, if there is a lot of carbonate in the water, this can sometimes crystalize and seal or obstruct the fine holes in this system. Either of these systems work well with the constant fertility program.

Fertilization

The advantages of constant liquid fertilization are very clear, but don't eliminate a quarterly dry top dressing of a semi-organic fertilizer.

The theory of applying fertilizer with an injector is quite simple, yet very logical. The more water a plant requires, the greater growth, and hence the greater fertilizer requirement. A plant never absorbs clear water, but constantly takes in small quantities of fertilizers with all water consumed.

It does not seem feasible to put fertilizer on in large quantities in either dry form or liquid form every two or three weeks and then proceed to leach-out that feed with clear water. Fertilizing constantly keeps the nutrient content uniform and at more desirable levels. Total soluble salts are generally lower because there is no tendency to water lightly while trying to avoid leaching a dry fertilizer that has just been applied.

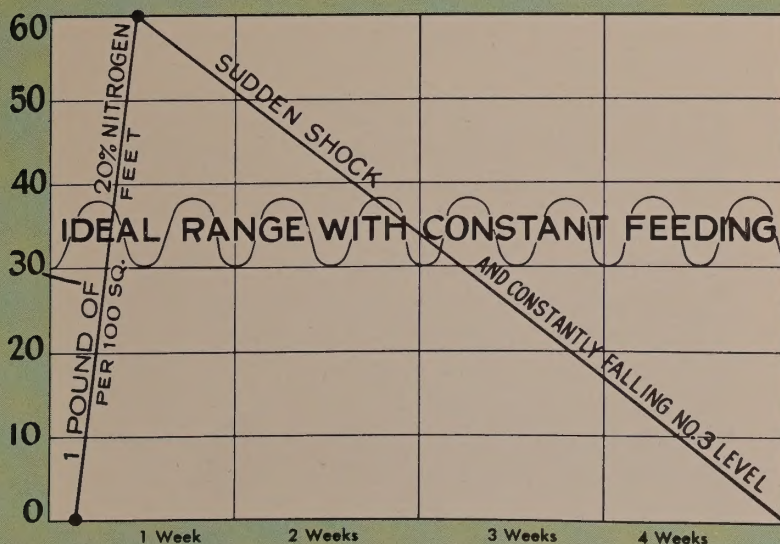
At Ohio State University, carnations, roses, cut chrysanthemums, snapdragons, pot mums, and diversified pot plants have all been grown on the same formula and the same soil with 20-20-20 or 20-5-25 at the rate of one ounce per 10, 15, 20, 30, and 60 gallons of water, applied at each watering. Observation of the plants, leaf color, and produc-

tion records, have indicated that those that are fertilized at the level of one ounce per 10 gallons of water and one ounce to 15 gallons of water were superior to the others. Plants fertilized at one ounce per 20 gallons were somewhat less desirable than the other levels. Labor saved by eliminating hand fertilization is significant.

Young cuttings planted direct are watered with the same solution. The fact that these small plants are watered less often, compensates for their smaller fertility requirements. For a month or so, tests are recommended to check soil levels. With constant liquid feeding in lighter amounts and with larger quantities of water applied through automatic devices, it is difficult to maintain potash levels at levels previously recommended above. Indications are now showing that with constant liquid fertilization, there will be a revision of potash levels downward.

It is very important with constant feeding to drip benches well with every watering.

PPM "Comparison of Monthly Feeding Versus Constant Feeding" NO_3 , Spurway



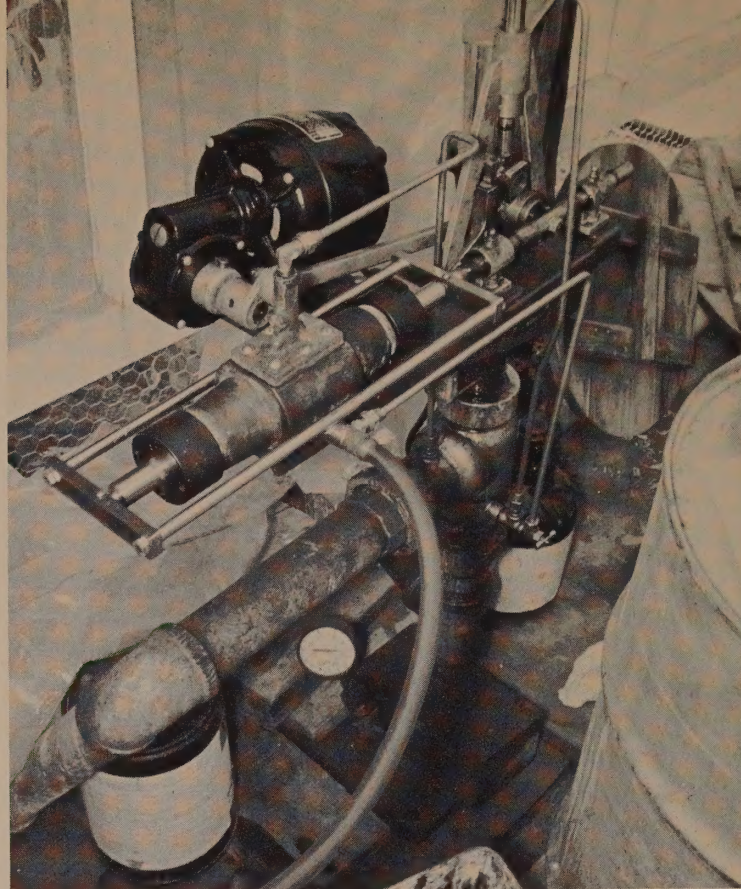
This chart, designed by Robert Peters, clearly illustrates the problem.

NITRATE RISE CHART
8 PPM, NO_3 SPURWAY
(Using 1:200 ratio injector, such as FERT-O-JECT)

Nitrogen Percentage	
46% (Urea)	7 oz. in 1 gal.
33.5% (Ammonium Nitrate)	9 oz. in 1 gal.
25% (25-10-10, 25-10-20, etc.)	12 oz. in 1 gal.
20% (20-20-20, 20-5-30, etc.)	1 lb. in 1 gal.
16% (Calcium Nitrate, Nitrate Soda, etc.)	20 oz. in 1 gal.
10% (Liquid 10-10-10, etc.)	2 lb. in 1 gal.

Application of Fertilizer

Apply small amounts
of fertilizer regularly.



Model E Fert-O-Ject delivers 5 to 120 g.p.m. at 200:1 ratio.

There are only two fertilizers that should be added to the soil prior to planting. These are phosphorous and calcium and can be added in any one of the following forms:

Phosphorous	Rate per 100 sq. ft.
Single superphosphate (20% P).....	5 lbs.
(or)	
Treble superphosphate (45% P).....	3 lbs.
(or)	
Steamed Bonemeal (25% P).....	6 lbs.
Calcium	
Dolomitic Limestone (30% Lime).....	10 lbs.
(21% Magnesia)	
(or)	
Agricultural Limestone (56% Lime).....	5 lbs.
(or)	
Hydrated Lime (80% Lime).....	5 lbs.
(or)	
Gypsum (Land Plaster).....	5 lbs.

The choice of the calcium carrier will depend on the soil pH. Dolomitic Limestone is the best material to use because of the presence of magnesium in this material. All material that is added to the soil should be very thoroughly mixed prior to steam sterilization.

With lighter soils of high peat moss, calcium deficiencies

are beginning to appear. This can be recognized usually when the plant is less than three months old and during a period of rapid growth. The leaf tip folds back sharply and it is straw-colored. The affected area is very slight, usually only ½ inch long. Sometimes there is a purplish area between the straw-colored section and the normal green of the leaf.

The addition of any form of nitrogen or potash fertilizers to the soil prior to planting is definitely not recommended.

MAINTAINING PROPER NUTRITIONAL LEVELS

pH (acidity)	6.5 to 7.0
Nitrate	25 to 40 p.p.m.
Phosphorous	5 to 10 p.p.m.
Potassium	20 to 40 p.p.m.
Calcium	150 to 200 p.p.m.
Soluble Salts*	30 to 50

*Solubridge reading with soil sample diluted 5:1.

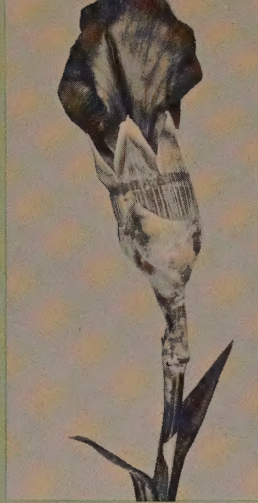
Run complete soil tests, including soluble salts 2 weeks prior to removing an old crop. If leaching is needed, it should be done while the crop is still in the bench and not when the bed is empty.



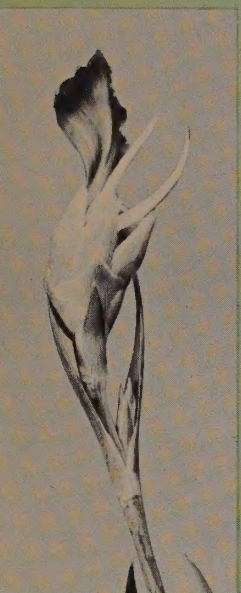
OPENING BUDS show a decrease in number of petals with Boron deficiency. Notice the pistil is starting to protrude out of the flower.



IN THIS severe example there is only one petal, but the pistil is greatly distorted. Boron deficiency can be corrected in a hurry once the symptom is diagnosed.



DISTORTED FLOWERS that bend or curve are a good example of Boron deficiency. This should not be confused with grassy, run-down stock.



THIS BAND around the calyx is not always present but positively identifies this symptom as one of Boron deficiency.



WHEN THE growing tip is very short-noded, with tips discolored, it is time to consider adding Boron to irrigation water.



THIS BREAK that is "stuck" and all curled up is an early symptom of Boron deficiency.



THE "WITCH-BROOM" or proliferated shoots below the terminal bud is a clear symptom to look for.

Boron Deficiency

Don't recklessly over-correct Boron deficiency. Make application on test section first.

Where carnation soils are used year after year with large amounts of nutrient-free peat moss added annually, it is reasonable to assume that boron deficiencies will continue to be a problem. Boron is difficult to analyze in a soil sample and the nature of boron is greatly affected by the amount of calcium that is present.

The growers who have observed symptoms as illustrated and have had the symptoms confirmed by the Agricultural Experiment Station can correct this with one application of Borax (household grade) at the rate of one ounce to 100 square feet of bench area or in liquid form at the rate of four ounces per 100 gallons spread over 400 square feet.

If you are in a boron-deficient area keep boron deficiencies from recurring by adding the following as borax to the irrigation water for continuous treatment:

1. Summer Months — 1 ounce per 1000 gallons. (10 oz. per 50 gal. with Fert-O-Ject at 1:200.)
2. Winter Months — ½ ounce per 1000 gallons. (5 oz. per 50 gal. with Fert-O-Ject at 1:200.)

Research workers warn the user of trace elements to be very cautious as the plants require extremely small quantities when compared with nutrient elements such as nitrogen, phosphorus or potassium. Boron should be applied only when necessary and make doubly sure that your soil is deficient in this element.

Carnation Diseases

Proper diagnosis is the first step
in determining disease control.

Bacterial Wilt and *Fusarium Wilt* were the most dreaded diseases of a decade ago. However, with the advent of cultured stock, mother-block cuttings, and better cultural methods, these two deadly diseases have almost been for-

gotten. With the major role that the carnation propagating specialist is assuming, these diseases take positions of lesser importance comparable to those of *Verticillium Wilt* or *Stunt* in the *Chrysanthemum*.

BACTERIAL WILT (*Pseudomonas Caryophyllii*)

Symptoms:

Plants wilt rapidly and turn a grey-green in hot weather. Plant turns straw-colored upon death, and it is possible to pull the above portion of the plant from the roots at the soil level, leaving the root system in the soil. Diseased tissue is sticky to the touch.

Control:

Steam-sterilization of soil, use healthy cuttings from cultured mother-blocks.



FUSARIUM WILT (*Fusarium Oxysporum Var. dianthi*)

Symptoms:

Plants generally die one branch at a time with the uppermost shoots bending toward the side of the infection. Upon complete death when the plant is pulled up, the roots come with it. Upon making a cross-section of the stem, there is a white ring just around the outside tissue.

Control:

Steam-sterilization of soil. Use of healthy plant stock from cultured mother-blocks.

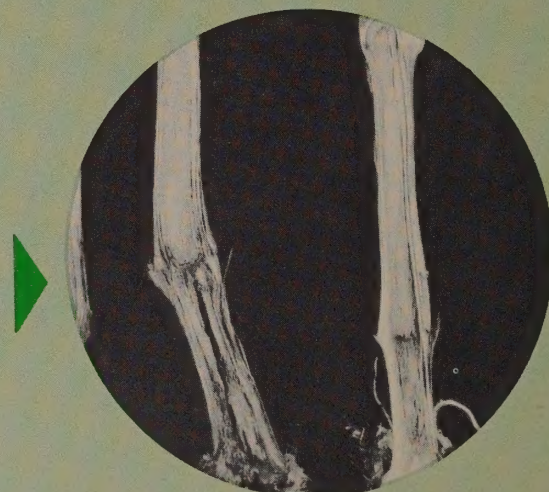
RHIZOCTONIA STEM ROT

Symptoms:

The diseased area which is at the soil level is very watery and upon death the tissue is dark brown and almost thoroughly disintegrated.

Control:

Thorough steam-sterilization of the soil, kills this organism. Treatment of newly steamed soil with Terrachlor (PCNB) is effective in giving lasting control over *Rhizoctonia*. Two lbs. of 75% material per 100 square feet of bench area is adequate. Avoid deep planting of cuttings or young plants.





FUSARIUM STEM-ROT (*Fusarium Roseum*)

Symptoms:

Fusarium stem-rot is one of the most difficult of the carnation diseases to control. The fungus causing this disease, must enter through a wound or open stem end. It is impossible to remove the threat of this disease with culturing. Upon taking a longitudinal cross-section, a small reddish area can be detected right at the base of the cutting at the callous line. Plants generally die from fusarium roseum shortly after they are established, before they are a height of over 15-18 inches.

Control:

Spray mother-block stock weekly with Captan or Parzate. Practice care in handling plants and avoid wounding stems. Avoid excess flashing of plants.

CARNATION RUST

Symptoms:

Long narrow lesions appear on stems or leaves and are filled with dark red spores. Rust will develop in free moisture.

Control:

Proper ventilation with heat lines on is the best control. A protective spray program every three weeks with Captan or Parzate is effective.



CARNATION RING SPOT (*Fairy Ring*)

Symptoms:

Raised circular lesions with a hole in the middle. Infected area appears like small crater. Infected area, surrounded by yellow ring.

Control:

Follow the same control measure as carnation rust. Keep foliage dry, avoid over-head watering, and spray every three weeks with Captan or Parzate. Again, proper ventilation with heat lines on.

BOTRYTIS FLOWER BLIGHT

Symptoms:

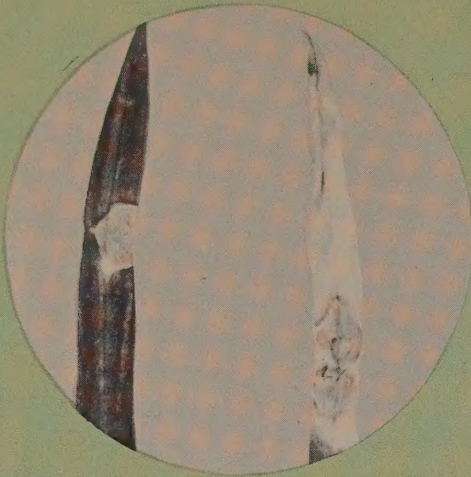
Flowers infected with Botrytis show a soft, water-soaked area at the edge of the petals and work downward towards the center of the bloom. Later stages of the disease show a visible brownish-gray organism growing over the top of the flower. Occurs during high-humidity periods prior to the time that heat is used.

Control:

Proper ventilation with heat lines on holds down condensation. Water plants in morning. Dusting open blooms with Botran 8% helps.



Carnation Diseases



ALTERNARIA LEAF SPOT AND BRANCH ROT

Symptoms:

This is an external disease of foliage and stem and shows up as tiny purple spots in the early stages. Later on, the infected area enlarges and the center turns to a light-brown sunken area bordered by purple. The main source of infection occurs in the propagating bench. The disease is spread by over-head watering or splashing.

Control:

Grow plants under a cover and spray regularly with Captan or Parzate.

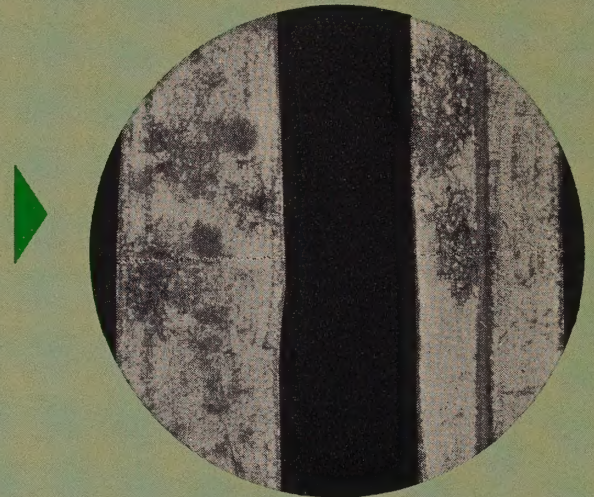
GREASY BLOTCH

Symptoms:

Early symptoms of Greasy Blotch are small radiate, spider-web-like patterns on the leaves and stems. These patterns result from the fact that the fungus is capable of dissolving the waxy "bloom" on the leaf surface.

Control:

Sustained high relative humidity favors development of Greasy Blotch. Proper ventilation with heat lines on helps lower the relative humidity. Spray programs of Zerlate or Captan are effective.



VIRUS (*Mosaic, Streak, and Yellows*)

Symptoms:

Mosaic is visible to a more pronounced degree in very early spring, usually late February or March. It expresses itself in visible stages when carnation growth is slow and when increased growth first starts in spring. Pale green or yellow longitudinal flecks develop the entire length of the leaf.

Control:

Plant only highly selected stock. Strict roguing eliminates most symptoms. Meri-stem or shoot-tip culture coupled with heat therapy have produced exceptionally vigorous plants which appear to be 100% free of virus. Such exacting laboratory procedures are being followed by the carnation cutting specialist.

FUSARIUM BUD ROT

Symptoms:

Bud starts to rot before it is fully open and dead area starts from the inside, showing a brownish moist decayed area of the inner floral organs.

Control:

Bud rot is spread by a small mite which wounds the inside of the unopened flower and inoculates the wounded area with the fungus. Pick off all infected buds and follow with a good insecticide program. Diazonon has been effective.

**Best control measure
for many carnation diseases:
Don't plant deep,
and run proper air.**

Insect Control

Use a good control program
before trouble strikes.
It is far less costly.

Aerosol bombs are efficient for the larger ranges and they are usually formulated with the latest insecticides. The standard aerosol (4 lbs.) will treat 200,000 cubic feet. The aerosol bomb should be heated in warm water to temperatures of around 100° to aid in dispersement of the fine particles. It should be emphasized that care should be used in following directions for the application of proper amounts of the aerosol bomb in a given area. Under-doses will give erratic kills and can lead to early build-up of resistant strains of red spider.

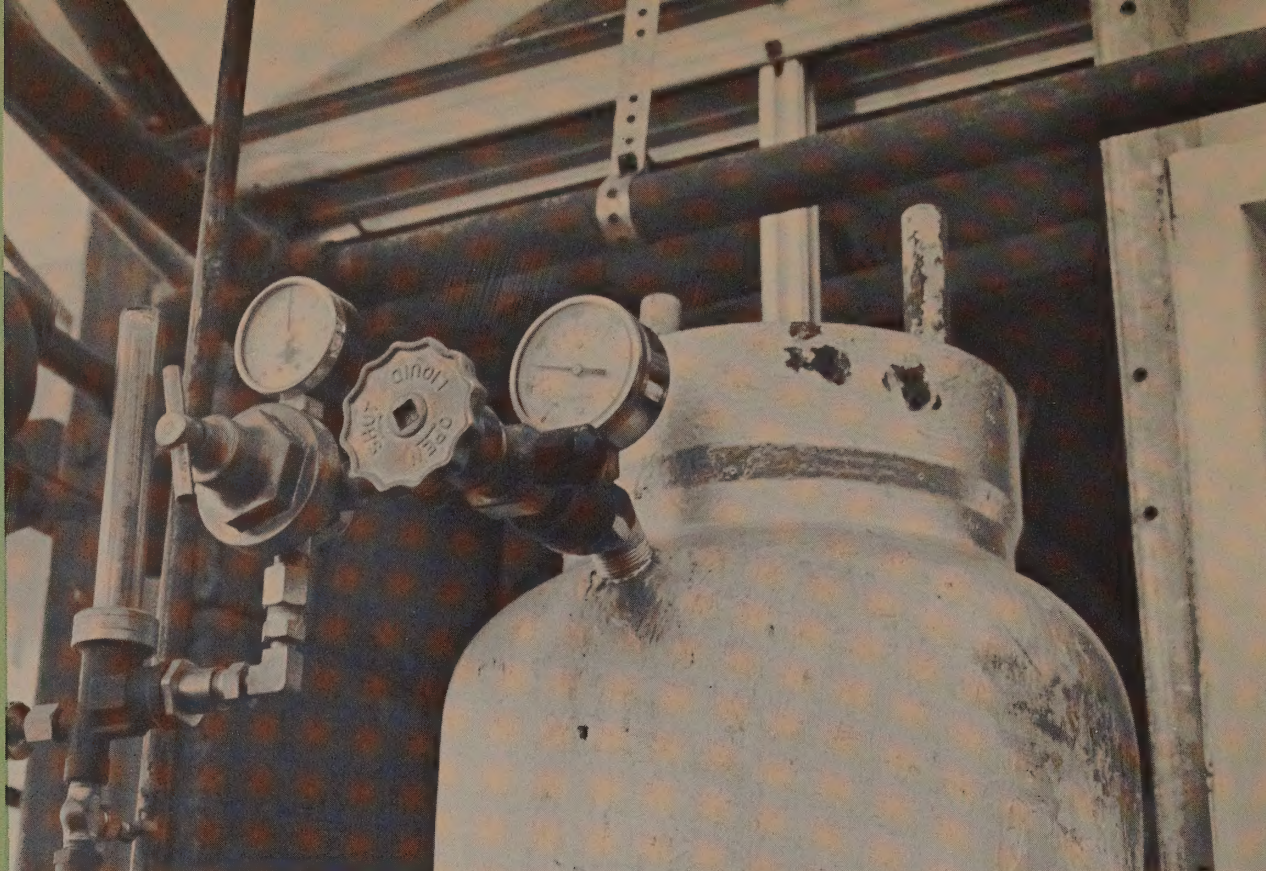
Spraying is still practiced with many carnation growers where high pressure spray systems, centrally located, apply large quantities of material which is finely atomized. Generally there is a wider range of insecticides available when working with spray materials. Fungicides (Captan or Parzate usually) can be added with the insecticides to produce a double-duty application.

Power Dusters, either electric or gasoline, is a form of applying insecticides to carnations that is often overlooked, or isn't used enough. It is a reasonable way to apply insecticides and all formulas and combination of insecticides can be easily formulated. Fungicides can also be added to dust.

INSECT	CONTROL (In spray forms or Aerosols)	DILUTION GUIDE — Amounts per 100 gallons
RED SPIDER	- Aramite - Chlorobenzilate - Dithion - Endrin - Kelthane - Ovaton - Parathion or Malathion - Tedion 90 - Trithion	Insecticides 2 lbs. 15% Aramite 1 lb. 25% Chlorobenzilate w.p. 2 lbs. Diazinon 25% w.p. 1 qt. "25% E.C." 2 lbs. 50% D.D.T. 1 pint 18% Endrin emulsifiable solution 1 lb. 25% Kelthane 1 pint 18% Kelthane emulsifiable solution 1 lb. 25% Lindane w.p. 2 lbs. 25% Malathion w.p. 2 pints 50% Malathion emulsifiable solution 5 pints 20% Metaldehyde liquid 1½ lbs. 15% Parathion w.p. ¼ lb. Tedion 90 1 lb. Trithion 25w
BUD MITE	Diazanon	
APHIDS	- Thiodan - Malathion - Lindane - DDT	Fungicides 1 lb. Ferbam 76% w.p. (Fermate) 1 lb. Zineb 65% w.p. Parzate, Dithane Z-78) 1 lb. Captan 50% w.p. (Orthocide) 1 lb. Botran 50% w.p. - Botran 5% dust
THRIP	- Dust or Bomb with Parathion, DDT, Lindane, Chlordane. - Dieldrin (in circulating water of fan and pad houses. 2 pts., 18.5% E.C. per 100 gal.)	Systemics ½ pint 21-23% Systox treats 500 sq. ft. 1 pint 90% Schradan (OMPA) treats 500 sq. ft. - Apply similar to a liquid fertilizer.

Other insects that can occasionally attack carnations are: cabbage looper, corn ear worm, fungus gnat, Fullers Rose Beetle, leaf tyer, tarnish plant bugs, cut worms and wire worms. These insects can usually be eliminated by any of the above materials and very seldom are seen if a strict spray program is followed.

Equipment needed for injecting CO₂ into greenhouses is simple and reasonable in cost.



Carbon dioxide concentrations

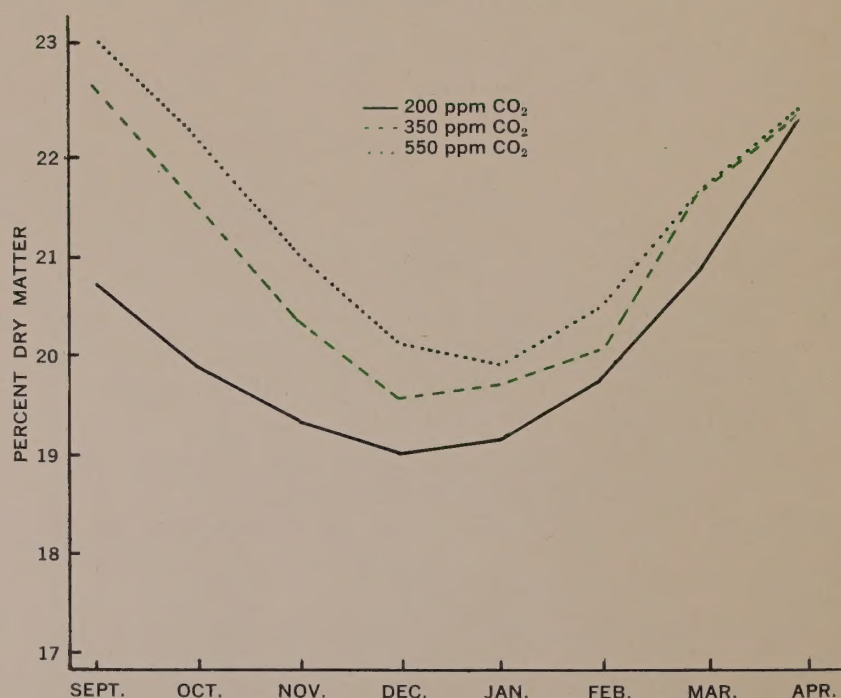
Harvested	200 ppm	350 ppm	350 ppm	550 ppm
9 weeks after planting				
Mean fresh wt. in grams	65.5	69.6	79.0	80.3
Mean dry wt. in grams	9.7	11.0	13.9	13.5
Percentage of dry matter	14.7	15.8	17.5	16.8
15 weeks after planting				
Mean fresh weight	208.0	222.5	218.0	242.0
Mean dry weight	38.9	46.7	45.1	55.3
Percentage dry matter	18.7	20.9	20.7	22.8

Effects of three carbon dioxide levels on fresh and dry weights of young Red Gayety carnation plants.

Carbon dioxide concentrations

	200 ppm	350 ppm	350 ppm	550 ppm
Accumulative yield for months ending:				
September 30, 1960	16	35	44	43
October 31, 1960	73	83	82	83
November 30, 1960	91	94	91	93
December 31, 1960	105	129	139	151
January 31, 1961	153	201	224	236
February 28, 1961	218	272	296	302
March 31, 1961	274	330	346	368
April 30, 1961	324	401	390	436
May 31, 1961	378	490	477	517
Total yield through June 2	381	494	482	521
Per cent malformed flowers	3.94	5.46	7.05	5.57
Speed of crop return				
Midpoint of first crop (1960)	Oct. 17	Oct. 6	Oct. 3	Oct. 3
Midpoint of second crop (1961)	Mar. 2	Feb. 21	Feb. 11	Feb. 16

Effects of increased carbon dioxide on yield of Red Gayety carnations.



Percentage of dry matter in carnations produced in three levels of carbon dioxide.

*From Colo. Flr. Growers Bulletin #138 "Effects of Carbon Dioxide on Carnation Growth."

Carbon Dioxide Injection

Estimated cost for CO₂ injection is 3¢ to 5¢
per square foot of bench area per year.

Carbon dioxide fertilization of the greenhouse atmosphere appears to be *"on the roll."* There is keen interest throughout the country in this phase of improving production in darker winter months when greenhouse ventilators are often kept shut because of cold weather.

Some reasons why CO₂ can play an important role in improving production are:

1. Greenhouses today are freer of decaying organic matter such as manure and mulches.
2. Many carnation ranges are run warmer in winter months than they were years ago, with less "top-air".
3. Equipment needed and the cost of CO₂ injection appears to be in line, cost-wise, to the predicted increase in production.

With the findings that CO₂ investigations are uncovering, there are other good lessons that will be learned other than the physical injecting of CO₂ into greenhouses. High carbon-dioxide-yielding organic matter will be stressed. Proper ventilation will be re-emphasized as a means to obtain the very cheapest source of CO₂ — that of outside air.

The phase of CO₂ in plant growth is well known and greenhouse investigators have advocated the addition of CO₂ to greenhouses prior to 1900 in the form of charcoal burners. *Holley* and *Goldsberry* have done an excellent job in bringing this problem out into the clear light by demonstrating graphically just how it improved production and how it could be reasonably installed in greenhouses.

Most greenhouses have used solid dry ice as the source of CO₂. More elaborate installations use liquid material in large tanks. Blocks of dry ice 10" x 10" x 10", or sliced pieces are placed in steel pressure tanks (converters) and as the dry ice turns into gas, it creates great pressure. Flowmeters, solenoid valves, and time-clocks can be so arranged

to meter a predetermined amount of the gas into the greenhouse. The gas is conducted throughout the greenhouse by 1/4" vinyl tubing with minute holes punched every 12 feet. One tube is used for every 8 to 10 feet of greenhouse by width. CO₂ diffuses with the greenhouse atmosphere very readily, so mixing is no problem. Some installations inject the CO₂ in the center of the air stream of circulating fans such as the Dutch Mill or Turbulator.

Carbon dioxide should be injected during the daylight hours only, and the brighter the day, the greater the demand is for CO₂, therefore, the period of 9:00 A.M. to 3:00 P.M. is recommended.

Cloudy Days — 2 cubic feet of gas per hour per 10,000 cubic feet of greenhouse. (This will maintain 300-500 p.p.m.)

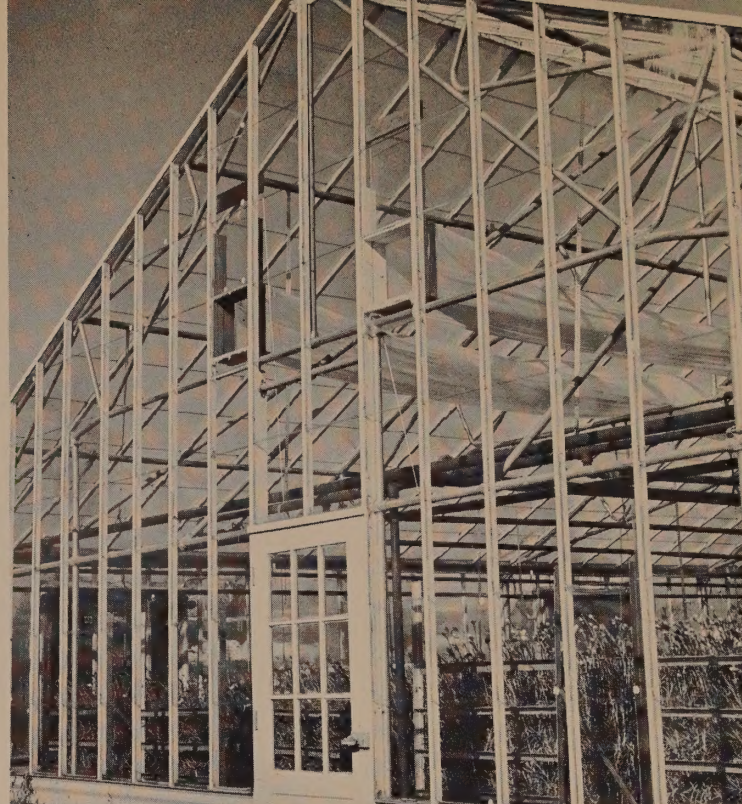
Bright Days — 3 cubic feet of gas per hour per 10,000 cubic feet of greenhouse.

One pound of dry ice will yield 10 cubic feet of carbon dioxide gas. The cost of dry ice is about 4½¢ per lb. and the equipment needed will vary in relation to the degree of automation, but such equipment is generally considered reasonable to install. One of the clearest advantages witnessed with the use of CO₂ injection is the evenness of cut flower production in severely cold weather. Blooms tend to open better with higher percentages of CO₂ in the atmosphere.

The quality of the air around the carnation plant appears to be one of the *"limiting factors"* affecting winter carnation production. There is no reason why this phase cannot be regulated as easily as other greenhouse environments such as greenhouse temperatures, soil fertility, soil moisture, and soil mixes. The process of injecting fertilizer into irrigation water was frowned on 10 years ago. Will CO₂ injection be as big a boon to the industry? Only time will tell — our only advice — *keep well posted!*

THE NEW LOOK:

Convection Tube



By opening gable hatch, above, air is sucked into convection tube and enters greenhouse without a draught. One tube is used during cold weather, two during milder weather.

Left, Polyethylene tubing with 2" holes spaced every 18" are cut opposite each other. Air enters high above plants and is evenly diffused.

Winter-time ventilation of greenhouses with fans has always been a problem. Avoiding "cold-blasts" or temperature differentials in a ridge and furrow range from the inlet to the discharge has plagued many who use fans in winter. Now the ingenious "Convection Tube" appears to overcome many of the problems in this field.

With only one or two fans on in a range of 50,000 sq. ft., enough of a vacuum will be created to properly inflate the convection tubes. Many different approaches to this problem are being tried and the project is far from complete, but this new idea is simple enough and reasonable enough in cost to warrant any grower to experiment with it. For any grower using hot water heat, who wants a mild change of air, it can easily be accomplished with this method.

The most satisfactory material being used is a 30" lay-flat piece of 1½ mil. polyethylene tubing (18" in diameter when tube is inflated). Holes two inches in diameter are cut opposite each other every two feet. This long tube is then closed at one end and is stretched the length of the greenhouse over the purlin pipes, or in the case of the truss house, it is threaded on a 16 gauge wire. The open end of the tube is then secured to a gable-end hatch where a single pane of glass is removed. A sliding door in the hatch regulates the number of convection tubes that are delivering outside fresh air. The advantages of this system are:

1. Provides air uniformly over the entire house without cold blasts.
2. Is a good means to distribute CO₂ in greenhouse.
3. Can be used in a closed system to recirculate greenhouse air, thereby providing uniform temperatures and heat distribution.

Walking into a range where convection tubes are installed feels fresh and crisp without detection of cold draughts. During cold bright days where raising ventilators is impossible because of ice, air can be safely changed. On houses over 30 feet wide, two tubes are used. This gives more accurate control as in cold weather only one tube is used, while during warmer periods both tubes can be used. A tube is "turned-in" by simply pulling a chord which raises a sliding door.

Some current installations are making the operation fully automatic with motorized hatches and thermostatically controlled fans.

The polyethylene used is the kind the dry cleaning industry slips over the garments and comes in endless rolls. It is very reasonably priced.

This type of convection tube seems to be the "missing link" in providing ventilation to plastic film greenhouses or the rigid fiberglass house. It helps to keep condensation down and provides for more uniform temperatures.

New Methods In Culture Indexing

Two new methods — “Shoot-tip Culturing” and
“Heat Therapy” are opening new fields in clearing carnations of virus.

Meri-stems or Shoot Tip Culture by the carnation propagation specialists is opening up new opportunities to free existing varieties of virus. Plants produced from this method of culturing are extremely vigorous with leaves in some cases as wide as an inch at the base. If the encouraging results continue, production and quality records of some of our commercial varieties will have to be rewritten. Heat therapy will work well in conjunction with Meri-stem Culture to provide the better strains of the future.

Such technical procedures as these, are being studied by leading propagators like Yoder Brothers. Like so many of the duties of the specialist of today, the carnation grower can hardly afford to follow the intricate detail of all of these exacting procedures. Here again this specialist can afford to take one small facet of our industry and strive to work

out all of the latest procedures and technicalities.

Post harvest treatment of carnations

Too little stress is made as to what happens to the carnation once it is cut. Real progress has been made within the last several years on the effectiveness of flower preservers such as Petalife. Results from actual tests indicate that the carnation bloom should never be put into clear water. In the greenhouse, through the wholesale house, on to the retailer, the container holding the cut flower should always contain preservative. Under refrigeration, flower preservatives are effective for one week. It is much more economical from a labor standpoint to fill buckets once a week than daily. Carnation growers using refrigeration, state that it is more economical with this system of using flower preservatives, than it was the old way.

The effect of
flower preservatives
and ionized water on
post harvest life of
carnations and roses:

TREATMENTS

POST HARVEST CARNATIONS

Water	6.3
Water + Ions	9.5
Floralife	12.9
Floralife + Ions	15.4
Keep	11.0
Keep + Ions	20.7
Petalife	14.6
Petalife + Ions	22.2

Suggestions
for extending
post harvest life
of cut flowers:

1. Cut base of stems before placing in solution.
2. Use solution at temperature of 100-110°F.
3. Use low temperatures to reduce respiration and extend life. 35°F. is better than 40°F.
4. Use clean containers.
5. Avoid ethylene producing materials.
6. Use flower preservatives continuously. Urge retailers, wholesalers, and your customers to do the same.



Remove the terminal bud when it is the size of a pea.

The Miniature Carnation

The demand for miniature carnations builds slowly and surely. It involves a job of customer education. Avoid heavy cropping and early over-production.

PRICES: MINIATURE CARNATIONS

WHITE

BABY DOLL (New) — A pure white spray seedling bred by Sal Greco, Middletown, Connecticut. The full flower has plenty of petals with practically no splitting. The deep serration of its petals adds to its fine form. Baby Doll develops a strong spray, often with four to six flowers open. Center bud removal should be practiced. The keeping quality rates with the Sim varieties. Because of its more attractive form, higher petal count and larger number of flowers open per spray, Baby Doll is preferred over White Elegance. All growers of miniature carnations will welcome the addition of Baby Doll. It is the first good solid color to appear on the scene.....

Price
Per 100

Price
Per 1000

15.00

130.00

WHITE FEATHERS (New) — Feathery white flowers — long graceful stems with four to eight well placed flowers per stem. Growth is tall with very heavy production. Very fragrant. Flowers are deeply serrated with excellent form. Destined to become one of the most popular of all miniatures. Flower size 2 inches to 2¼ inches. Patent applied for

22.00

180.00

WHITE ELEGANCE — White sport of "Elegance". A strikingly beautiful flower with all the qualities of "Elegance". (Flowers slightly smaller.) We feel certain this variety will be at least as popular as "Elegance", perhaps more so, as it can be colored and tinted as desired.....

22.00

180.00

The recently developed miniature, or spray carnation, has filled a demand for a smaller carnation and has had wide acceptance by the retail trade. It is steadily making in-roads with the florist, and new varieties like **Baby Doll**, **White Feathers**, and **Tinker Bell**, will create even more demand in the future.

Cultural Recommendations for Growing Spray Carnations:

1. Planting distance — 6" x 6" (somewhat closer than standard).
2. Cut low on first crop. Present varieties are free-breaking.
3. Remove the terminal bud instead of the side disbuds. This bud should be the size of a pea when removed.
4. Cut the spray when 2 flowers are open with color showing on the remaining flowers. These partially open flowers will develop fully in water.
5. Bunch so there are about 35 flowers or buds showing prominent color. Bunches will average six to nine stems and bunch length will vary between 20 to 26 inches (selling price has averaged about \$1.50 a bunch).

PINK

TINKER BELL (New) — Light shell pink. Color resembles that of the popular shade Virginia Hercules. Perhaps the most popular color of all of the new miniatures. Spray formation is not quite as good as some, but production is high and Retailers love it. Keeping quality is excellent. Height is medium. Flower size 2½ inches.

	Price Per 100	Price Per 1000
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	22.00	180.00
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RED

CINDY (New) — Salmon red — slightly frosted. Excellent spray formation with four to seven terminal flowers per stem. Growth similar to Elegance in height and production. A good color addition to the miniature family

	22.00	180.00
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PETER PAN (New) — Rich maroon — good formation. Grows similar to Elegance in height and production. Flower size 2 inches. Perhaps the best keeper of all miniature carnations. Beautiful in arrangements, and makes the perfect boutonniere

	22.00	180.00
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ROYALETTE (New) — A first prize winner at A.C.S. Convention of 1960 in Boston. Color is purple with fuchsia edges. A strong productive growing seedling. Popular with Retail Florists

	22.00	180.00
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6. The existing miniature carnation varieties tend to crop heavily. Try to plant and pinch the crop on a staggered rotation, planting a new batch every three months. An even production of the miniature carnation is the most important phase of its culture.
7. Miniature spray carnations carry over well, and production evens out nicely the second year. Those benches scheduled for carry-over, of course, must be cut low.
8. Plan to spend more time disbudding, cutting, grading, and selling this new type of carnation, but even so, you will make money at it.

Emphasis Point

Keep production even. Be patient until it catches on. Some carnation growers when first growing this type, cropped it so heavily that the market wasn't ready for the large production. These growers became impatient and threw their varieties out. Two months later, retailers were begging for it. Remember that any introduction of a new variety or type takes time, but it is worth the fight to have this diversity. One look at the rose grower, and the percentage of Floribundas that he is growing now, should be a guide to the carnation grower.

VARIEGATED

BO-BEEP (New) — White with purple stripes (like Harlequin) makes long graceful sprays with many flowers, four to eight terminal flowers per stem. Grows tall with heavy production. Flower size 1½ inches to 2 inches. A real good novelty

	22.00	180.00
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ELEGANCE — New Addition — Exquisite sport now quite widely grown and increasing in popularity all the time. Color is white flushed deep pink. Very productive and vigorous

	15.00	130.00
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EXQUISITE — Lavender flushed purple. The original miniature variety

	14.00	120.00
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SCARLET ELEGANCE — A sport of "Elegance" similar in color except that it is salmon red where "Elegance" is pink. Same growth habits as its parent. This color fits in well where a soft red is desirable rather than pink

	22.00	180.00
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UCONN DOROTHY OBER — Color is yellow with pink flecks. A seedling developed by Dr. Gus Mehlquist at University of Conn. This variety may be grown as a medium sized standard, but we find it adapts well as a spray type with many strong laterals. A tall vigorous grower

	22.00	180.00
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WENDY (New) — White with delicate pink stripes. Growth, production, and spray formation very similar to Elegance. A very popular color. Flower size 2 inches

	15.00	130.00
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Flower size of present varieties can be maintained, and in many cases, improved through diligent selection. Selections toward deeper, fuller crowned flowers is a constant responsibility of the cutting specialist.



Carnation Varieties/Prices

WHITE

ALASKA — New Sport

Homer Hill's pure white sport of White Sim. Alaska combines a stronger, heavier stem with a calyx that appears to be quite resistant to splitting

Price Per 100	Price Per 1000
14.00	120.00

BGA ATLAS — New Seedling

Chalk white the year around. Remarkably resistant to splitting. Of medium height, its vigorous breaking action and speed of flowering make for early, heavy production

15.00	130.00
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AURORA

Exceptionally large white. Flower size and heavy stem are points of emphasis. Performs best in higher than average carnation temperatures, and with a narrow range of difference between day and night temperatures. An average to heavy producer

11.00	90.00
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COLO. WHITE SIM

Holley's reselection of Wht. Sim. Most important asset is its non-splitting trait. Has fewer petals and straighter winter stems. Vigor and production remain the same

11.00	90.00
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CRYSTAL VIRGINIA HERCULES

Clear white sport from Virginia Hercules. Same fine form and keeping quality as parent. Will open from cuts made at tight bud stage

14.00	120.00
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GAY WHITE — New Sport

Bob Alenius of Denver, Colorado, contributes this unique and beautifully formed, pure white selection from Gayety. Gay White has a full, well rounded crown flower

14.00	120.00
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HOOSIER SPICE

Excellent producer, with very fragrant flowers. Flowers are pure white. (Res.)

15.00	100.00
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IMP. OLIVETTE

A more vigorous, taller reselection of Olivette. Excellent boutonniere and corsage flower. Fragrant

Price Per 100	Price Per 1000
12.00	90.00

IMP. WHITE SIM

Large white sport of Wm. Sim. Best under high winter light intensities to improve stem strength

11.00	90.00
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IWATAS WHITE

Sport of Gayety with all the vigor and quality of parent. Flower is high crowned and produces higher percentage of fancy flowers than other selections. (Res.) Minimum order 250

15.00	150.00
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NORTHLAND

Large white. Very fragrant

13.00	100.00
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SELECT WHITE SIM

Peterson's selection of White Sim

11.00	90.00
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BGA SILVANUS

Normally larger than White Littlefield with longer, stronger stems. Performs well under Sim temperatures. Large calyx is seven lobed with splitting far less than Sims. Production is higher than Littlefields with superior keeping and shipping quality

14.00	120.00
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WHITE APOLLO

White sport of Apollo. Unequalled for year-round productivity. A marked improvement over Olivette for flower size and stem strength during the winter months. More versatile than Apollo since it is not subject to fading and has an improved summer form

11.00	90.00
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U. CONN SIM #1

This selection of White Sim is the result of gamma radiation. There

Carnation Varieties/Prices

are 10 to 15 fewer petals than other Sims resulting in "Split-Free" production. Stems are very strong and wirey. Flowers are somewhat smaller than other selections, but form is excellent

Price Per 100	Price Per 1000
12.50	100.00

WHITE LITTLEFIELD

Very large flower. Strong stem.....

15.00	100.00
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WHITE SIM

The original White Sim selection which is noted for its low incidence of splits. Primarily a West Coast selection

11.00	90.00
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BGA WOGAN

Large white. Littlefield type flower with very strong winter stems and top production. Bred by Howard Yoder, Wogan is an especially fine producer under northern winter light conditions

15.00	130.00
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LIGHT PINK

AKAWEE — (South Wind)

A shell pink carnation with smooth edged petals and Charm form three to three and one-half inches in diameter. (Res.)

14.00	120.00
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APHRODITE

A true light pink. An early producer with an early comeback. Best in high light intensity areas.....

13.00	110.00
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COLO. LIGHT PINK SIM — New Addition

Highly selected Colorado State University strain of Crowley's Pink Sim. Superb winter color but light in summer

11.00	90.00
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ELLEN MARIE

True light pink sport of Dusty. In winter months approaches color of Light Pink Littlefield. True pastel pink with no salmon shades in the center of the flower. One of the best light pink Sim selections for winter and spring production. (Res.).....

14.00	120.00
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IMP. LIGHT PINK LITTLEFIELD

Peterson's selection of Light Pink Littlefield

Price Per 100	Price Per 1000
11.00	90.00

KIRA'S FLUSH PINK SIM

Sport of Crowley's Pink that has real life. Color is vivid and appears iridescent. Vigorous growth

15.00	150.00
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LINDA

Selection of light pink from Mamie. More intense color than Pink Sim. Very full flower with deep crown. Extremely vigorous

14.00	120.00
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NANCY THOMPSON

Light Pink Littlefield selection.....

11.00	90.00
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PINK BEAUTY

Sport of Pink Sim. Very strong grower. Retains color during hot weather. Salmon Pink

11.00	90.00
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PINK SIM (Crowley's)

Sport of Wm. Sim. Strong grower. Very little splitting

11.00	90.00
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PETERSON'S NEW PINK

Selection of Light Pink from Mamie. Better color than regular Pink Sim.....

11.00	90.00
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SELECT LIGHT PINK LITTLEFIELD

A deeper pink selection of Imp. Light Pink Littlefield. Does not throw as many variegated flowers.....

11.00	90.00
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SHIBUYA LIGHT PINK SIM

Sport of Mamie. Slightly deeper color than Pink Sim. Holds color well in summer. (Res.) 250 minimum

12.50	100.00
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TAMA — New Seedling

True light pink with Camellia form and very even petal edge. Bred by Howard Yoder. A new and sparkling color that is best described as a flushed pink.....

15.00	130.00
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VIRGINIA HERCULES

Well known for its form, color and keeping quality. Air cooling has extended its period of value.....

12.00	100.00
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SALMON PINK

APOLLO

Soft salmon pink, strong stems, heavy production **11.00** **90.00**

#2 APOLLO

An improved selection in Apollo with larger flower size and markedly increased stem length. Color remains the same as Apollo. The improved vigor in stem and size is evident throughout the year..... **11.00** **90.00**

ATHENA

A lustrous salmon pink slightly deeper than Venus and possessing a greater color clarity than Apollo under low light intensities. A reliable winter producer. Has vigor, stretch and rigid stems. Does not split **11.00** **90.00**

DEBBIE

Salmon Pink sport of Sim. Color is between Salmon Sim and Pink Sim..... **11.00** **90.00**

DUSTY

Soft pastel pink. Sport of William Sim. Petals more ruffled than Pink Sim. Silver overlay. Smart color..... **11.00** **90.00**

DUSTY ROSE

Sim selection of rose pink with a silvery overlay. Similar to Dusty but with an intensified color. Excellent quality blooms **12.50** **125.00**

FLAMINGO SIM

Softer Salmon Pink than Shocking Pink with less splitting..... **11.00** **90.00**

KEEFER'S CHERI SIM

The deep salmon-rose pink color is even throughout the flower with very little flaking and remains bright during the hot weather. One of the best producing Sim sports. (Res.)..... **15.00** **100.00**

LADDIE SIM

An intensified Salmon Sim. Color remains smooth and uniform throughout the year, being especially good at high temperature periods. Appears to be more resistant to splitting than Salmon or Pink Sim **11.00** **90.00**

BGA PARIS

Picardy salmon pink. Deeply serrated form. Much stronger than Sims. Color is smooth and holds well in all seasons. Vigorous growth that should not be overfed. Fine stretch and production..... **14.00** **120.00**

PORTRAIT

Brilliant rose-pink that holds its color at all seasons of the year. A sport of Mamie with the same strong growing habits **11.00** **90.00**

SALMONAISE

Salmon pink sport of Virginia Hercules. Larger flower **13.00** **100.00**

SALMON SIM

Peterson's light salmon colored Sim sport. Identical in growth characteristics to Pink Sim..... **11.00** **90.00**

SHIBUYA SIM

Considered one of the best salmon Sim sports. Holds color exceptionally well. Sport originated from Mamie. This variety does not show a tendency of sleepiness that is so prevalent in this color class of Sim. (Res.) 250 minimum **11.00** **90.00**

DARK PINK

BOSTON

Clean, healthy grower. Strong stem, short habit **11.00** **90.00**

CITATION

Rose Pink with large round perfectly shaped flowers **15.00** **100.00**

IMP. SIDNEY LITTLEFIELD

Selection of Sidney Littlefield that is freer of virus with much better color blooms than parent..... **12.00** **100.00**

MENTOR

Rich, rose-pink. Strong, rigid stems. Notable keeping and color retention properties throughout the year..... **12.00** **100.00**

SUSAN

Seedling of Patten & Co. Dark Rose Pink, strong stems, excellent color..... **150.00**

Carnation Varieties / Prices



Production under fiberglass houses like these is superior to glass houses.



Interior of fiberglass house — no ventilators.

RED

CARDINAL SIM

Large scarlet-red sport of Wm. Sim. The most vigorous and productive of the red Sim sports. Less petal serration. Rarely splits

Price Per 100	Price Per 1000
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11.00	90.00
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DARK RED SIM

Sport of Wm. Sim. Leading scarlet. Large flower. No white streaking

11.00	90.00
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COLORADO RED SIM

An improved Wm. Sim. Greater vigor and productivity

11.00	90.00
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ELLIOTS RED SIM — New Addition

Slightly darker than Red Gayety producing a very high percentage of top quality flowers. Slight tendency to bullhead on first crop. A warm temperature variety that is especially good for continuous two-year cropping programs

Price Per 100	Price Per 1000
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14.00	120.00
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EMBER SIM — New Addition

Scarlet red. Continues to be grown for its outstanding color, size and keeping quality. Subject to easy splitting and requires careful attention to uniform temperature control

11.00	90.00
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HILL'S IMP. RED SIM

Sport of Wm. Sim. Outstanding for its improved vigor, stretch and rapid cropping habit. Flowers are somewhat larger being similar in form and color to Wm. Sim. The longer stems of good rigidity are especially valuable on the early crops

11.00	90.00
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BGA MARS

Outstanding scarlet red. Stems are stronger than Sims with equal vigor and production. Nicely serrated flower with strong calyx and far less splitting than Sims

14.00	120.00
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PETERSON'S NEW RED

This is a form selection of Cardinal Sim with serrated petals. Same advantages as Cardinal with less splits and strong stems

11.00	90.00
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RED GAYETY

This is the standard red used in Colorado. Improves the color of other sports, with vigorous growth

11.00	90.00
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SCANIA

Single plant selection from Sweden that breaks lower than most Sims. Growth is shorter and flower has a very high crown. Good color of red. Strong stems

11.00	90.00
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SOLRED — New Sport

Lennard Hakansson's improved selection of Scania. Stems of Solred are stronger and its color is a deeper red than Scania

14.00	120.00
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CRIMSON

CRIMSON PRINCE

Medium flowered crimson with heavy production. Unsurpassed as a boutonniere flower. Seldom burns.....

	Price Per 100	Price Per 1000
.....	15.00	100.00

DIPLOMAT (New)

Maroon seedling of Baur-Steinkamp. Good color — heavily serrated. Ships and handles without burn. (Res.)

	Price Per 100	Price Per 1000
.....	20.00	150.00

TOPPER

Crimson-red. Very clear, bright color with medium sized flowers. Fine stretch with wiry, strong stems. Very productive, free growth. Does not split

	Price Per 100	Price Per 1000
.....	12.00	100.00

CHIPPEWA

Lively crimson of good size, with very upright growth. Production is excellent with strong stems throughout year. Seedling of Olympic and Littlefield. Does not burn.....

	Price Per 100	Price Per 1000
.....	15.00	100.00

YELLOW

BRAUN'S YELLOW SIM

Yellow sport of Harvest Moon. Excellent grower. Color becomes slightly buff in winter.....

	Price Per 100	Price Per 1000
.....	11.00	90.00

CORINNE

Yellow sport of Sim.....

	Price Per 100	Price Per 1000
.....	15.00	100.00

BGA HELIOS

Clear sparkling yellow completely devoid of pink or white streaks. Outstanding stem strength and vigor. Tall grower. Does not split. Make cuts above lateral breaks to speed up return crops. Best yellow on the market

	Price Per 100	Price Per 1000
.....	14.00	120.00

MILLER'S YELLOW

An improved color selection from Miller's Yellow

	Price Per 100	Price Per 1000
.....	12.00	90.00

PAJEE

A deep yellow carnation with some light pink flecking. The market accepts it readily as a yellow.

Good deep flower with serrated petals. A vigorous grower which branches freely from the base. Stems are stiff and of medium height. Flowers three to three and one-half inches in diameter. Rarely splits. (Res.)

	Price Per 100	Price Per 1000
.....	14.00	120.00

YELLOW SIM

Sport of Harvest Moon. Same habits. Color is a shade lighter than Miller's Yellow

	Price Per 100	Price Per 1000
.....	11.00	90.00

NOVELTIES

ANNIVERSARY

An improved Scarlet Sim. Splits occasionally

	Price Per 100	Price Per 1000
.....	11.00	90.00

CASSANDRA

A lively yellow-orange variegated. Pink pencilling. Rarely splits. Flower has excellent substance and is an outstanding keeper

	Price Per 100	Price Per 1000
.....	11.00	90.00

COOPER'S VARIEGATED SIM

Light pink background with medium to large red pencil markings. One of the fastest and most reproductive of the Sim sports.....

	Price Per 100	Price Per 1000
.....	11.00	90.00

ELEGANCE

Rose-pink with white edges. Sport of Exquisite. Should be grown as a spray carnation, having 4 to 8 blooms per stem. All blooms open. Ideal novelty for corsages and miniature arrangements. (Res.)

	Price Per 100	Price Per 1000
.....	15.00	130.00

EXQUISITE

Deep purple with lighter orchid edging. Recommended as a spray carnation

	Price Per 100	Price Per 1000
.....	14.00	120.00

DEEP PURPLE — New Addition

Selected from Orchid Beauty. Color is greatly intensified. General vigor and foliar traits are improved. Novel and beautiful two-tone color.....

	Price Per 100	Price Per 1000
.....	14.00	120.00

GARNET SIM

Sport of White Sim. Scarlet red background with uniform white pencilling

	Price Per 100	Price Per 1000
.....	12.00	100.00

Carnation Varieties/Prices

GAYETY

Variegated Sim. Flesh pink background overlaid with bright red pencil pattern. More stable than Cooper's Variegated

Price
Per 100 Price
Per 1000

12.00 100.00

HARVEST MOON

An amber-gold sport of Wm. Sim. Richly colored

11.00 90.00

LORRAINE

Portrait color with light frosting and narrow bands of white. Sport from S. Arthur Sim

14.00 120.00

MAMIE

Variegated Sim sport. White background overtoned with thin red pencil striping

11.00 90.00

MANDARIN

A darker orange selection of Tangerine Sim. Outstanding color.....

25.00 150.00

MELANIE

A clear, very desirable new color in carnations. Best described as melon or apricot. A sport selected from Harvest Moon by A. N. Pierson Co. Has been grown for several years with excellent customer acceptance. Growth and production habits similar to parent with better flower characteristics in winter.....

22.00 180.00

MOONLIGHTER

A seedling from Colorado State University. Maroon flecks on a clear light pink background. Very intensely colored novelty. Strong stems, splits occasionally

150.00

ORCHID BEAUTY

Flushed purple

14.00 120.00

PEKING PINK LITTLEFIELD

A white tipped scarlet. Very outstanding color

11.00 90.00

PIKE'S PEAK SIM

Flushed pink with frosting. Darker than Frosted Sim

Price
Per 100 Price
Per 1000

11.00 90.00

S. ARTHUR SIM

Sport of Cardinal Sim. Uniform, narrow scarlet red bands on a pure white background. Very stable to color and pattern. Size is larger and stems are stronger than average for Sim varieties. Splitting is no problem. An outstanding variegated Sim

11.00 90.00

SCARLET SIM

A tone on tone Sim sport. Color ranges from an intense scarlet at the base of each petal to a frosty white at the petal margins. Color becomes most intense under low temperature winter conditions

11.00 90.00

SUNSET

Beautiful warm orange sport of Cardinal Sim. Has all the desirable characteristics of Cardinal Sim.....

11.00 90.00

SYMPHONY

Mauve with reddish purple stripe. Very delicately different

15.00 100.00

TANGERINE SIM

Brilliant orange color is solid throughout. Very warm shade. Good producer and keeper. (Pat. Pend.)

17.50 125.00

TETRA SARAH JANE

Tetraploid of Sarah Jane Knipe. Large flower and heavy growth.....

15.00 100.00

TROMBETTA'S FLUSHED PINK SIM

Flushed red with white stripes. Selection from Mamie. Color remains the same year round. Retains the vigor of parent. (250 minimum.)

18.00 150.00

Carnation Varieties

offered by Yoder Brothers

WHITE	Price Code	YELLOW	Price Code	SALMON PINK	Price Code
Alaska	Y-12A	Brauns Yel. Sim	Y-9A	Apollo	Y-9A
BGA Atlas	Y-13A	Harvest Moon	Y-9A	#2 Apollo	Y-9A
Aurora	Y-9A	BGA Helios	Y-12A	Athena	Y-9A
Colo. White Sim	Y-9A	Pajee	Y-12A	Debbie	Y-9A
Crystal Virg. Hercules	Y-12A			Dusty	Y-9A
Gay White	Y-12A	CRIMSON		Flamingo Sim	Y-9A
Imp. White Sim	Y-9A	Topper	Y-10A	Laddie Sim	Y-9A
BGA Silvanus	Y-12A			YGA Paris	Y-12A
White Apollo	Y-9A	VARIEGATED		Portrait	Y-9A
White Littlefield	Y-10A	Anniversary	Y-9A	Shibuya Sim	Y-9A
White Sim	Y-9A	Cassandra	Y-9A	Venus	Y-10A
BGA Wogan	Y-13A	Deep Purple	Y-12A		
		Garnet Sim	Y-10A	DARK PINK	
LIGHT PINK		Gayety	Y-10A	Imp. Sidney Littlefield	Y-10A
Akawee	Y-12A	Lorraine	Y-12A	Mentor	Y-10A
Aphrodite	Y-11A	Mamie	Y-9A		
Colo. Lt. Pk. Sim	Y-9A	Orchid Beauty	Y-12A	RED	
Ellen Marie	Y-12A	Pikes Peak Sim	Y-9A	Cardinal Sim	Y-9A
Lt. Pk. Littlefield	Y-10A	S. Arthur Sim	Y-9A	Colo. Red Sim	Y-9A
Linda	Y-12A			Dk. Red Sim	Y-9A
Petersons New Pk. Sim	Y-9A	MINIATURE-SPRAY TYPES		Elliots Red Sim	Y-12A
Pink Sim	Y-9A	Baby Doll	Y-13A	Ember Sim	Y-9A
BGA Tama	Y-13A	Elegance	Y-13A	Hills Imp. Red Sim	Y-9A
Virginia Hercules	Y-10A	Equisite	Y-12A	BGA Mars	Y-12A
				Petersons Red Sim	Y-9A
				Red Gayety	Y-9A
				Scania	Y-9A
				Solred	Y-12A

YODER VARIETIES ONLY

PRICE TABLE

Per 100	Y-9A	Y-10A	Y-11A	Y-12A	Y-13A
1000 (or more)	\$ 9.00	\$10.00	\$11.00	\$12.00	\$13.00
500-950	9.50	10.50	11.50	12.50	13.50
300-450	10.00	11.00	12.00	13.00	14.00
100-250	11.00	12.00	13.00	14.00	15.00
50 (of a variety)..... (per 50)	6.50	7.00	7.50	8.00	8.50

2. WHEN THE TOTAL NUMBER of cuttings purchased by a customer for shipment within a 52-week period is more than 7500 cuttings, deduct from list price as follows:

7,500 to 12,450 cuttings.....	2.0%
12,500 to 19,950 cuttings.....	4.0
20,000 to 29,950 cuttings.....	6.0
30,000 to 42,450 cuttings.....	8.0
42,500 to 57,450 cuttings.....	10.0
57,500 to 74,950 cuttings.....	12.0
75,000 cuttings and over.....	15.0

3. FOR EARLY ORDERING AND PROMPT PAYMENT deduct (after step 2 at left) as follows:

If order is received by us in the specified time prior to shipping date requested and provided the invoice is paid within 28 days after date of invoice, customer is entitled to an additional deduction after above listed percentages for quantity as follows:

Less than 2 months.....	2.0%
2 months, but less than 6 months.....	7.0
6 months, but less than 8 months.....	12.0
8 months or more.....	15.0

INSECTICIDES

ARAMITE 15W

Used to control Red Spider Mites.

4 lb. bag \$3.25 Case — 12 x 4 lb. bags \$35.00

ARAMITE LIQUID 2E

Red Spider Mite Control.

1 gallon \$13.00

CHLOROBENZILATE 25W

For control of Spider Mites.

4 lb. bag \$5.25 Case — 12 x 4 lb. bags \$53.50

D. D. T. 50W

General purpose. For most leaf eating, chewing insects, soil pests, thrips, white flies.

4 lb. bag \$1.55 Case — 12 x 4 lb. bags \$16.50

ENDRIN 1.6 LB. LIQUID

Excellent for control of Cyclamen Mite, Aphids, Thrips, etc.

1 gallon \$12.50 4 gallons \$10.40 per gal.

KELTHANE W

For control of both Cyclamen and Red Spider Mites.

4 lb. bag \$5.50 Case — 12 x 4 lb. bags \$60.00

KELTHANE 18.5 LIQUID

Red Spider Mite control.

1 gal. \$11.00

Case — 4 x 1 gal. cans \$10.25 per gal.

LINDANE 25W

For Aphids, Thrips, Leafhoppers, Spittlebugs, Symphylids.

4 lb. bag \$7.00 Case — 12 x 4 lb. bags \$78.00

LINDANE 1 1/2 %

50 lb. bag \$11.75

MALATHION 25W

For Spider Mites, Aphids, Thrip, Scales, Leafhoppers and Rollers, Mealy Bugs, Caterpillars, Beetles, White Flies and Tarnished plant bugs.

4 lb. bag \$2.75 Case — 12 x 4 lb. bags \$28.70

MALATHION LIQUID 5-E

1 gallon \$11.50

NICO FUME LIQUID

To control Aphids, Thrips, Chrysanthemum Leaf Minor and Marguerite Fly.

1 gallon can \$16.25

PARATHION 15W

To control Aphids, Spider Mites, Caterpillars, Leaf Rollers, Thrips, Beetles, Mealy Bugs, White Flies and Rose Midge.

3 lb. bag \$1.75 Case — 16 x 3 lb. bags \$25.00

P-40 (2% SODIUM SELENATE)

For chewing and sucking insects on plants other than edible crops. Food crops not to be grown in treated area for 12 months.

25 lbs. \$12.50 50 lbs. \$22.50 100 lbs. \$40.00

SODIUM SELENATE (PURE)

For control of Aphids, Red Spider, Cyclamen Mites and some Nematode.

4 oz. \$4.00 1 lb. \$12.50

SYSTOX

A systematic insecticide for control of Foliar Nematode, Aphids and Spider Mites. (For soil application only.)

1 gallon \$30.75

TEDION 25

For control of Red Spider Mites.

2 lb. bag \$4.00 Case — 12 x 2 lb. bags \$44.75

TEDION 90

For resistant Spider Mites. (Can combine with Aramite for highly resistant mites.)

1 lb. bag \$7.20 Case — 12 x 1 lb. bags \$78.00

THIODAN EMULSION

For control of Aphids, White Fly and Cyclamen Mites.

1 gallon \$10.00

THIODAN 50W

2 lb. bag \$4.75 Case — 12 x 2 lb. bags \$52.00

VAPATONE XX EMULSIVE

For control of Aphids, Thrips, Red Spider and Leaf Hopper Nymphs.

1 gallon \$12.00

SPREADER STICKER

For use with Agricultural Chemicals.

1 gallon \$9.50

FUNGICIDES

A. D. O.

A drench for controlling damp-off in seed flats. Also effective in controlling the spread of Rhizictonia, Pythium and Fusarium, Stem Rot Diseases.

Pint (treats 1,000 sq. ft.) \$4.95 Quart \$9.50

BOTRAN 50% WETTABLE

For the control of Bortrytis grey mold on Mums, Carnations, Begonias, Hydrangeas, Geraniums, Gladiolus.

3 lb. bag \$5.55

BOTRAN 8% DUST

For the control of Bortrytis grey mold on Chrysanthemums, Hydrangeas, Geraniums and Roses in the field and storage.

50 lb. bag only \$22.50

CAPTAIN

For Leaf Spot and Bortrytis control. Not adequately effective against Rusts, Powdery Mildew, Bacteria.

5 lb. \$4.50

10 x 5 lbs. \$40.00

FERBAM

Controls Fungus Leaf Spots. Not effective against Bacteria or Powdery Mildew.

3 lb. bag \$2.00 Case — 12 x 3 lb. bags \$21.60

GEROX

For effective control of Fusarium and Bacterial Rot (Black Leg) of Geraniums. Also other rots caused by Rhizictonia Solani, a soil and damp-off Fungus.

150 grams — \$8.00 Post Paid

(Treats approx. 6,000 2 1/4" pots)

TERRACHLOR W. P. 75% (PCNB)

Soil treatment for control of Rhizoctonia and Sclerotium Rolfsii.

5 lb. bag \$4.65 Case — 10 x 5 lb. bags \$44.00

ZINEB 65W

To control Rusts, Fungus Leaf Spots, Bortrytis Blights. Not effective against Bacteria or Powdery Mildews.

3 lb. bag \$2.50 Case — 16 x 3 lb. bags \$37.00

VAPAM (SOIL FUMIGANT)

For controlling weeds, weed seeds, Nematodes, and soil Fungi.

1 gallon \$4.75

THIODAN

(Pressure Fumigators)

Contains 15% Thiodan. For the control of resistant Green Aphids, White Fly, Chrysanthemums. Green Aphid and many other Aphid species.

10,000 cu. ft. \$12.00 per carton of 12

20,000 cu. ft. \$18.00 per carton of 12

FUMIGATORS

FULEX PARATHION FUMIGATOR

For Red Spider, Aphids and Thrip.

Carton — 24 Cans.

2,000 cu. ft. \$12.00

5,000 cu. ft. \$14.50

10,000 cu. ft. \$17.00

20,000 cu. ft. \$26.00

FULEX APHID SMOKE FUMIGATOR

For Aphid and adult White Fly.

Carton — 24 Cans.

2,000 cu. ft. \$11.00

5,000 cu. ft. \$14.00

10,000 cu. ft. \$17.00

20,000 cu. ft. \$25.00

FULEX SPIDER MITE FUMIGATOR

For Red Spider including some parathion resistant strains on Carnations, Chrysanthemums and Snaps.

Carton — 24 Cans.

2,000 cu. ft. \$11.50

5,000 cu. ft. \$14.50

10,000 cu. ft. \$19.00

20,000 cu. ft. \$31.00

FULEX NICOTINE FUMIGATOR

Carton — 12 Cans.

10,000 cu. ft. \$8.50

20,000 cu. ft. \$14.00

FULEX TEDION FUMIGATOR

Carton — 12 Cans.

5,000 cu. ft. \$9.50

20,000 cu. ft. \$21.00

10,000 cu. ft. \$12.50

20,000 cu. ft. \$21.00

PLANT FUME 103

For control of Spider Mite, Aphid, Thrip.

Carton — 36 cans

Carton — 12 cans

5,000 cu. ft. \$12.00

20,000 cu. ft. \$12.00

TEDION® DITHIO FUMIGATORS

Contains 15% Tedion, 12.5% Dithio for control of resistant Red Spider, Mites, Aphids, White Fly, Mealy Bug, soft brown scale and Thrip.

10,000 cu. ft. \$15.00 per carton of 12

20,000 cu. ft. \$26.00 per carton of 12

Sim is better than ever...

Have you seen Alaska, Solred, or Uconn Sim No. 1? It is superior selections like these that will continue to keep the Sim Family on top of the carnation list. One has only to look at the rose business to see how the selection of Better Times fell off until just recently. The carnation grower should be truly thankful that this has not happened to his crop.

The fields of "carnation selection" and "cutting production" are turning into two very distinct operations. For the first time, the talented carnation grower who knows how to select good carnations can be paid for his talent and time in developing superior strains. Royalties are being paid to growers making outstanding selections by Yoder Brothers. Well known growers such as Homer Hill, Homer Pearson, Bob Alenius, and Clair Maier have assigned their impressive new selections of *Alaska*, *Solred*, *Gay White*, and *Ellen Marie* to Yoders for introduction. Art Petersen, in introducing the split-free variety *Uconn Sim No. 1*, has worked out a similar plan with the University of Connecticut and Gus Melquist, its originator. Through intensified efforts such as these, all carnation growers can take an active part in helping to maintain and improve present selections.

The diligent carnation grower who cuts the crop is the person best qualified to make superior selections. He is working with his crop every day in the week. Now for the first time, it will be possible for him to be paid for his important contribution.



Note the difference in stem diameter and flower size on White Sim on left and Alaska on right.

Gloeckner Publications

- Gloeckner Flower Seeds
- Gloeckner Chrysanthemum Manual
- Gloeckner Carnation Manual

Fred C.
Gloeckner
&
Company,
Incorporated

15 East 26th Street • New York 10, N. Y. • ORegon 9-6460



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